

Fold-back perineoscrotal flap plus penile inversion vaginoplasty for male-to-female gender reassignment surgery in circumcised subjects

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Abstract

Background The use of the penile skin for vaginoplasty is a common method in male-to-female (MTF) transsexual surgery. We aim to describe the results of a one-stage vaginoplasty in previously circumcised sex reassignment surgery using fold-back perineoscrotal flap plus penile inversion flap.

Methods In a prospective study, 112 previously circumcised MTF subjects underwent a modification of penile inversion vaginoplasty by adding a fold-back perineoscrotal flap to form the whole posterior vaginal wall and about half of the anterior vaginal wall (the proximal part). Patients follow-up, outcomes, and complications were recorded.

Results The mean age of the subjects was 25.8 ± 3.3 years underwent feminizing genitoplasty. The success rate was 92.86 %, and the complication-free success rate was achieved in 74.11 % of subjects in general. The need for repeated surgery (failure rate) was 7.14 % (due to vaginal shrinkage in four patients, bulging in anterior vaginal wall in one case and excessive labial skin in three cases). By adding the perineoscrotal flap to the penile skin flap, we were able to reach a mean vaginal depth of 13.1 ± 1.7 and a satisfaction level of 85.71 %.

Conclusions Fold-back perineoscrotal flap plus penile inversion vaginoplasty is a suitable surgical approach for achieving adequate vaginal depth in cases of male-to-female (MTF) transsexual vaginoplasty when subjects have short penile skin flap because of circumcision.

Level of Evidence: Level III, therapeutic study.

Keywords Transsexual · Vaginoplasty · Penile inversion · Perineoscrotal flap

Introduction

Benjamin Franklin for the first time described transsexualism as a gender identity disease in 1953 [1, 2]. In transsexuals, gender identity is inconsistent with their physical characteristics, genetic type, hormonal status, and occasionally the perception of others about their gender. Such individuals, after passing the essential psychological and legal steps and obtaining the necessary permits (licenses), undergo various hormonal interventions followed by different surgical operations.

In transsexual male-to-female (MTF) cases, the most important surgical approach is feminizing genitoplasty which aims to create a female external genitalia with desirable function and appearance [3, 4]. The use of the penile skin for vaginoplasty is a common method in MTF transsexual surgery [5–8]. One of the main challenges in this technique is the resultant reduced vaginal depth, in cases with a short penis. This problem is further compounded in circumcised patients, who have lost 5 to 6 cm of the penile flap. To overcome the problem of short penis flap in MTF genitoplasty, we used a modified surgical technique. Here, we report our experience with this procedure and our outcomes.

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Patients and methods

From January 2009 to April 2013, 112 transsexual subjects were prospectively enrolled in our study. All patients had passed psychological courses and had obtained the legal license necessary for performing surgery. In addition, all patients had received the essential hormonal treatments under the supervision of a well-trained endocrinologist. At time of inclusion in the study, the protocol was fully explained to each patient and the probable functional and esthetic outcomes, and also the possible complications of the procedure were discussed and an informed consent was obtained.

During the surgical procedure, the duration of each operation, any complication such as injury to the adjacent organs or bleeding was recorded. Moreover, during the hospitalization period, all of the side effects including hemorrhage and the need for blood transfusion, lower extremities neurological deficit, and the duration of hospitalization were recorded.

Follow-up visits were scheduled every 3 months during the first post-op year, every 6 months thereafter, and whenever the patient had a complaint. To ensure completion of follow-ups, we called each patient who failed to show up for a follow-up session. On each follow-up visit, a detailed history was taken and a thorough physical examination was performed. On physical examination, we looked for any physical anomalies, vaginal or meatal stenosis, and carefully measured vaginal depth. Moreover, subjects were asked if they are satisfied or not with surgery and the outcome.

The procedure was considered successful if subjects did not develop any complication or just experience minor complications such as meatal stenosis which could be corrected with minor procedures. Complication-free success was defined when patients were satisfied with the outcome and had no adverse effects after discharge from hospital. Failure was defined as a case that required another surgical repair.

Surgical technique

A fluid regimen was prescribed for the patients from 2 days prior to surgery. Antibiotics and enema were administered before starting the surgical procedure. All the surgeries were performed by the same surgeon.

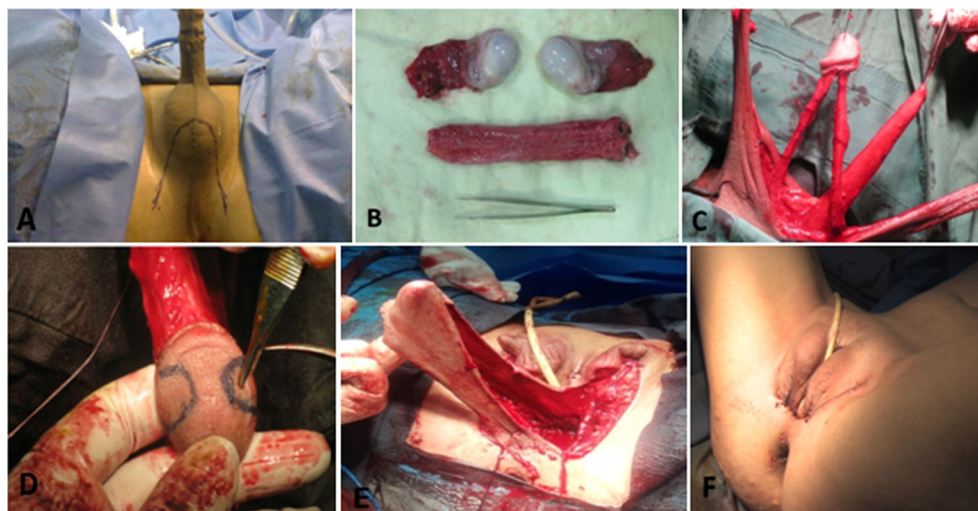
Under general anesthesia, the patients were placed in the lithotomy position. At the first half of study, the patients were placed in this position during the entire surgery but in order to avoid the neurological complications postoperatively, we decide to change the position of patients from lithotomy to supine for 30–45 min in the middle of surgery and after rechange of position, we have continued the operation. After a long inverted U perineoscrotal and a circumcision incision

(Fig. 1a), the surgical procedures were performed on the following sections:

1. Bilateral orchidectomy accompanied with excision of the remaining cord. (Fig. 1b)
2. Complete penile disassembly was performed with preservation of the neurovascular bundle on dorsal side of penis (Fig. 1c). Corpora cavernosa was released up to the inferior line of the pubic symphysis and then excised. Afterwards, the remaining erectile tissue of the corpora was destroyed by electrocautery and sutured with a 2–0 Vicryl thread sutures.
3. Neoclitoris formation: This was performed by using two small dorsolateral sections of the glans penis and by preserving the afferent nerves and vessels and connecting them in the central line (Fig. 1d).
4. Female urethroplasty: This was achieved by performing a longitudinal cut on the dorsal surface of the urethra (corpus spongiosum) from the distal part up to 4–5 cm of the proximal part. The dissected distal section was sutured to the mid-section of the penile skin as a part of the anterior vaginal wall. The proximal part of the urethra was considered as the female urethra and the constructed meatus was fixed 1 cm underneath the clitoris.
5. Vaginoplasty: After excising the bulbospongiosus muscles and cutting off the urethrectal muscle, a special space is formed between the rectum, the bulbomembranous urethra, and the prostate (with special care of not injuring the rectum) which can be extended. Then, a long perineoscrotal skin flap was created and sutured to the penile skin flap. The whole structure was shaped into a sac by folding the flap back on its own (Fig. 1e). This was eventually invaginated in the created cavity and deeply fixed to the sacrospinous ligament. Considering the shortness of the penile skin flap and the elongated perineoscrotal flap, the whole posterior vaginal wall and about half of the anterior vaginal wall (the proximal part) was formed by the perineoscrotal flap.
6. Labioplasty of the major and minor labias was done by the remaining scrotal skin, on both sides. With a V→Y plasty, the major labias were pulled downwards to make a better external image. In addition, by placing sutures between the skin of the inferior abdomen and the superior part of the pubic symphysis, a favorable shape for the mons pubis was created (Fig. 1f).

At the end of the surgery, we placed a vaginal stent and fixed it in its exact position. The vaginal stent was removed on the fifth post-op day.

Fig. 1 **a** An inverted U perineoscrotal and a circumcision incision. **b** The testes and penis after bilateral orchidectomy and penectomy. **c** Complete penile disassembly. **d** Neoclitoris formation using of two small dorsolateral sections of the glans penis. **e** Perineoscrotal skin flap before penile inversion vaginoplasty. **f** The shape of external genitalia at the end of labioplasty



Results

One hundred twelve patients with a mean age of 25.8 ± 3.3 years underwent feminizing genitoplasty. During the mean follow-up period of 13.3 ± 6.7 months (min 6 and max 24 months), the success rate was 92.86 % and the complication-free success rate was achieved in 74.11 % of subjects in general. The need for repeated surgery (failure rate) was 7.14 % which was due to vaginal shrinkage in four patients, bulging in anterior vaginal wall in one case and excessive labial skin in three cases. The mean operative time was 3.7 ± 0.5 h, and the mean duration of hospital stay was 6.2 ± 0.5 days.

Although all our patients were circumcised, by adding the perineoscrotal flap to the penile skin flap, we were able to reach a mean vaginal depth of 13.1 ± 1.7 .

During and after the operation, 15 patients (13.39 %) required blood transfusion due to severe hemorrhage which did not lead to a re-operation for controlling the bleeding in any of the cases. Rectal injury did not occur in any of the subjects.

Six patients (5.35 %) experienced weakness in their lower extremities after the operation, which in all cases resolved during the hospitalization period and all able to walk normally at the time of discharge. All of these patients were from the first half of patients who were at lithotomy position during the entire surgery, and after we decided to change the position of the patients for a while during operation, we did not meet any neurologic problem postoperatively.

Wound infection was diagnosed in six cases (5.35 %), resulting in suture opening in two patients, and was controlled in all cases by the administration of maintenance therapies.

Vaginal stenosis was observed in seven patients (6.25 %) during follow-up. Two of these patients underwent dilatation under general anesthesia, and in other cases, this condition was overcome with the use of intermittent dilatations performed by the patients.

Urinary complications were detected in eight cases (7.14 %) as recurrent urinary tract infection in four and meatal stenosis in four. All cases of meatal stenosis were treated by intermittent dilatation.

Gradual vaginal shrinkage was observed in four patients (3.57 %) who required a second surgery, 6 months after the first operation in three cases and 9 months later in the other. On the second operation, repeated vaginoplasty was performed with the application of an amniotic membranous graft for covering the vagina. These patients are in good general condition now.

Four cases complained of bulging in the anterior vaginal wall due to the opening of the urethra, which in one case led to its excision in a second surgical operation. Three patients underwent surgery due to the excessive labia skin and its undesirable appearance. Unilateral labial hematoma was formed as a post-operative complication in one of them which was managed by drainage. Vaginal prolapse, rectal fistula or urinary system, and bladder fistula were not seen in any patient during the follow-up period.

Regarding the satisfaction level of patients on the performed surgery during follow-up, 96 (85.71 %) of the patients were satisfied with the appearance and function of their new genital system. Sixteen patients (14.29 %) expressed their dissatisfaction, ten due to the vaginal depth and/or stenosis and six because of the appearance of genitalia. During the follow-up period, none of the cases regretted making the decision of undergoing gender reassignment surgery.

Discussion

Transsexualism is a special condition in which patient faces exceptional social and psychological stress. Gender reassignment surgery seems to be the best solution for primary transsexuals and alleviates subjects' psychological problems [9–11]. The improvements made in the legal processes in many countries have allowed a greater number of patients to seek this type of surgery [4].

Genitoplasty of male-to-female (MTF) transsexuals can be achieved by several different methods including the use of intestinal flaps, skin grafts, and also genital and non-genital skin flaps [3, 4, 12, 13].

The main goals of a successful vaginoplasty are a desirable external appearance, an acceptable width and depth of neovagina, and preserving the erogenous sensation.

Today, the best preferred method for vaginoplasty in male-to-female transsexuals is the use of a penile skin flap, while the other techniques are used for secondary repair surgeries [4]. In this method, the formation of scar in the introitus region is avoided and considering that such flaps have their own blood supply, the trend for shrinkage is much lower [14].

Nevertheless, it should be kept in mind that the penile flap should be used for covering the perineal area; therefore, in cases with a short penis or a smaller penile flap due to previous circumcision, a favorable depth and width for the neovagina may not be achieved. Perovic et al. mentioned that if there is insufficient penile skin (a small and/or circumcised penis), the short skin tube and long urethral flap will not be in proportion. The vagina can then be formed in two ways. The proximal part at the base of the vagina is formed only from the urethral flap, which initiates secondary epithelialization. If the tube pedicle is too short to place the tube into the perineal cavity, the new vagina is created using the vascularized urethral flap and free penile skin grafts. In this case, the vascularized urethral flap plays the key role in creating the new vagina [15]. Like that, the application of skin grafts and/or their addition to the flap have been suggested, but skin grafts can become constricted and lead to vaginal shrinkage [16, 17]. In this respect, various investigators have recommended the use of scrotal flaps in forming the neovagina. Namba et al. used an M shaped perineoscrotal flap for vaginoplasty with good results [16].

In 50 MTF patients who underwent penile inversion vaginoplasty by Wagner et al. [4], mean vaginal depths was 10 cm; the most common complication was vaginal shrinkage in 10 % of subjects. In our study, all patients were already circumcised; therefore, the created penile flap was short and covered the perineal area and just the anterior wall of the vagina. In order to construct a vagina with an acceptable depth, we used long perineoscrotal flap. This flap formed the whole



Fig. 2 The final appearance of external genitalia in closed leg or standing position

posterior vaginal wall, was folded on itself, and formed a great portion of the proximal section of the anterior vaginal wall. By using this flap, we achieved a mean vaginal depth of 13.1 cm.

The major concern in this technique considering the length of the flap is flap necrosis and eventually vaginal



Fig. 3 The final appearance of external genitalia in supine position (with slightly apart legs)

shrinkage. This was seen in four of our cases and resolved by a second surgery and the application of the amniotic membranes.

The other complications of our surgical method were comparable with similar studies [15, 18–20]. Such complications resulted in corrective surgery in only eight cases: four cases due to vaginal shrinkage, one case because of bulging in anterior vaginal wall, and three cases due to excessive labial skin. Also, our experience in urethroplasty resulted in the need of few redo-genitoplasties [21, 22]. Careful attention to the acceptable shape of female external genitalia and try to achieve the best shape during genitoplasty resulted in that we have needed minimal redo-genitoplasty in our cases. The need for redo-genitoplasty is reported more in other recent studies (23). Also, we should keep in mind that although genitoplasty can result in a good shape in the standing position, but other potential malformations may become more visible in lithotomy position. The final appearance of external genitalia in our experience in different cases and different positions is shown in Figs. 2 and 3.

The advantages of our study was the prospective nature of our study design, relatively large number of subjects enrolled and introduction of a modified surgical approach which allows for achieving adequate vaginal depth. Potential short-comings of the study are short follow-up time, inability to discuss full issues related to sexual gratification during intercourse, and the fact that this report reflects the experience of a single center and a single surgeon.

Conclusion

Fold-back perineoscrotal flap plus penile inversion vaginoplasty is a suitable surgical approach for achieving adequate vaginal depth in cases of MTF transsexual vaginoplasty when subjects have short penile skin flap because of circumcision.

Conflict of interest None

Patient consent Patients provided written consent for the use of their images.

Ethical standards The study was approved by the ethics committee and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. All patients signed the informed consent.

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